

REMARKS

Claims 1-17 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of the amendments and remarks contained herein.

Applicant thanks Examiner Dolinar for the courtesies extended during a telephonic interview conducted on April 13, 2005. During the interview, Applicant presented arguments to the Examiner that Tanaka et al (U.S. Pat. No. 6,546,910), Ule (U.S. Pat. No. 4,009,695), and Shiraishi et al (U.S. Pat. No. 6,039,026), individually and collectively, do not show, teach, or suggest every element of the claimed invention.

With respect to claim 17, Applicant presented arguments that Tanaka does not disclose preventing air flow in a cylinder in response to a low load condition. Applicant proposed amendments to claim 17 as described in the preceding section and the Examiner agreed to withdraw the rejection under 35 U.S.C. § 102(e). Applicant amends claim 17 as discussed in the interview in order to bring the claim into condition for allowance.

With respect to claims 1-16, Applicant presented arguments to the Examiner that Ule, Tanaka, and Shiraishi do not disclose disabling an intake and exhaust valve to trap fuel in a selected cylinder while the engine continues to run. Applicant and the Examiner agreed to the amendments to the claims as described in the preceding section, and the Examiner agreed to withdraw the rejections under 35 U.S.C. § 103(a). Applicant amends claims 1, 6, and 12 as discussed in the interview in order to bring the claims into condition for allowance.

REJECTION UNDER 35 U.S.C. § 102

Applicant respectfully traverses the rejection of claim 17 under 35 U.S.C. § 102(e) as being anticipated by Tanaka et al (U.S. Pat. No. 6,546,910).

Applicant amends claim 17 to recite “in response to said low load condition.” Tanaka does not show, teach, or suggest preventing air flow in a cylinder in response to a low load condition.

As best understood, Tanaka discloses individually controlling torque in engine cylinders by determining a target torque and controlling intake and exhaust valves according to the target torque. In cases of low-load operation, the intake and exhaust valves, throttle actuator, and fuel injection valve are controlled to minimize fuel consumption while satisfying target cylinder torque (column 13, lines 13-22). Fuel injection is set to an amount corresponding to the target cylinder torque. However, air intake is not reduced, and exhaust gas recirculation (EGR) is increased in order to create a lean air-fuel ratio (column 13, lines 23-29). The throttle valve is set to a “fully-open” state (column 13, lines 35-37).

Tanaka does not disclose deactivating a cylinder to substantially prevent air flow through the cylinder in response to the low load condition. In contrast, Tanaka discloses maintaining the throttle valve in the fully-open state, as well as increasing EGR.

Tanaka does not disclose preventing air flow in a deactivated cylinder in response to a low load condition and injecting fuel into said deactivated cylinder. Therefore, Applicant respectfully submits that claim 17 is allowable over Tanaka.

REJECTION UNDER 35 U.S.C. § 103

Applicant respectfully traverses the rejection of claims 1-5 and 12-16 under 35 U.S.C. § 103(a) as being unpatentable over Ule (U.S. Pat. No. 4,009,695) in view of Tanaka et al (U.S. Pat. No. 6,546,910), and further in view of Shiraishi et al (U.S. Pat. No. 6,039,026).

Applicant respectfully traverses the rejection of claims 6-11 under 35 U.S.C. § 103(a) as being unpatentable over Ule (U.S. Pat. No. 4,009,695) in view of Tanaka et al (U.S. Pat. No. 6,546,910).

As best understood, Ule discloses disabling engine ignition prior to stalling in order to trap a combustible charge in “the appropriate cylinders” (column 19, lines 17-20). When the engine is stalled, the intake and exhaust valve rotaries continue to rotate, and cylinder pistons operate accordingly. The engine is restarted by delivering ignition to the cylinders “whose pistons are in a position to crank the engine in the proper direction” (column 19, lines 10-13). In other words, the computer has no control over which cylinders trap the combustible charge. The computer disables ignition and allows the engine to stall. Subsequently, the computer delivers ignition to cylinders that happen to be in the proper position, and that include a combustible charge. This method does not ensure that a cylinder will trap a combustible charge. Therefore, it may be necessary to inject fuel air mixture into the next two or three cylinders in the firing sequence after the engine is stalled in order to ensure that the cylinders will trap a combustible charge (column 10, lines 20-36).

Ule does not show, teach, or suggest deactivating one or more selected cylinders to trap fuel in the selected cylinders while the engine continues to run, and subsequently

igniting a fuel/air charge in said one or more selected cylinders. In other words, Ule does not disclose a method that guarantees that a fuel/air charge sufficient to create starting torque will be trapped in a minimum number of cylinders before deactivating the engine. Further, Ule does not disclose disabling an intake and exhaust valve of a selected cylinder. Instead, Ule discloses stalling the engine and allowing the intake and exhaust rotaries to continue to rotate until stalling is complete.

In contrast, Applicant teaches a method that is performed on one or more selected cylinders to ensure that at least one cylinder is available for combustion-assisted starting. Cylinders with deactivated intake and exhaust valves and a disabled spark plug maintain a trapped air/fuel charge regardless of continuing crankshaft revolution (paragraph [0034] of the Application). Applicant's method does not rely on a mere possibility that the engine will stall with a combustible charge trapped in a cylinder.

Applicant amends claim 1 to clarify "injecting fuel that is sufficient to create starting torque into a selected cylinder," "disabling a spark plug of said selected cylinder," and "disabling an intake and exhaust valve to trap said fuel in said selected cylinder." Ule does not disclose disabling a spark plug and an intake and exhaust valve of a selected cylinder while the engine continues to run.

Further, combining Ule with Tanaka and/or Shiraishi does not arrive at the Applicant's invention. Neither Tanaka nor Shiraishi teaches or suggests injecting fuel into a selected cylinder, disabling ignition and intake and exhaust valves of the selected cylinder, and subsequently disabling the engine. As discussed above, Tanaka discloses disabling ignition, intake and exhaust valves, and fuel injection of an inoperative cylinder. The Examiner relies on Shiraishi to demonstrate that it is known to

provide an engine having electronically controlled intake and exhaust valves. However, merely disclosing electronically controlled intake and exhaust valves does not teach or suggest injecting fuel into a selected cylinder, disabling a spark plug and intake and exhaust valves of the selected cylinder, and deactivating the engine.

Therefore, Applicant respectfully submits that claim 1 is allowable over Ue, singly or in combination with Tanaka and/or Shiraishi. Claims 2-5 depend from claim 1, and therefore are allowable.

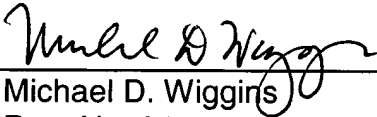
Referring to claims 6 and 12, Applicant amends claims 6 and 12 to include limitations analogous to claim 1. Therefore, the arguments made above with respect to claim 1 are equally applicable to claims 6 and 12. Applicant believes that claims 6 and 12 are allowable for the same reasons. Claims 7-11 and claims 13-16 depend from claims 6 and 12 and are also allowable.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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